

Final Environmental Assessment

# Fagaalu Village Flood Project

Territorial Emergency Management Coordinating Office

PDMC-PJ-09-AS-2003-02

*November 2004*



**FEMA**

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**FINAL ENVIRONMENTAL ASSESSMENT**

**FOR**

**FAGAALU VILLAGE FLOOD HAZARD MITIGATION  
FAGAALU, AMERICAN SAMOA  
(PDMC-PJ-09-CA-2003-002)**

**Prepared for  
Federal Emergency Management Agency**

**Prepared by  
URS Corporation, Inc.**

**November 2004**

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ASCMP	American Samoa Coastal Management Program
ASDOC	American Samoa Department of Commerce
ASEPA	American Samoa Environmental Protection Agency
ASHPO	American Samoa Historic Preservation Officer
BFE	base flood elevation
BMP	best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CY	cubic yard(s)
dba	a-weighted decibel(s)
EA	Environmental Assessment
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
NAAQSs	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
PDM	Pre-Disaster Mitigation
PNRS	Project Notification and Review System
TEMCO	American Samoa Territorial Emergency Management Coordinating Office
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

The American Samoa Territorial Emergency Management Coordinating Office (TEMCO) has applied to the Federal Emergency Management Agency (FEMA) for funding under the Pre-Disaster Mitigation (PDM) Program to complete a flood control project. The PDM Program was authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Title 42 of United States Code Part 5133, as amended by Section 102 of the Disaster Mitigation Act of 2000, Public Law 106-390, 114 Statute 1552, to assist states/territories and communities to implement sustained, pre-disaster, natural-hazard mitigation programs to reduce overall risk to the population and structures, while also reducing reliance on funding from actual disaster declarations.

FEMA has prepared this Environmental Assessment (EA) to evaluate the impacts of the PDM Program project. The EA has been prepared according to the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA (Title 40 of the Code of Federal Regulations [CFR] Parts 1500–1508), and FEMA’s implementing regulations (44 CFR Part 10).

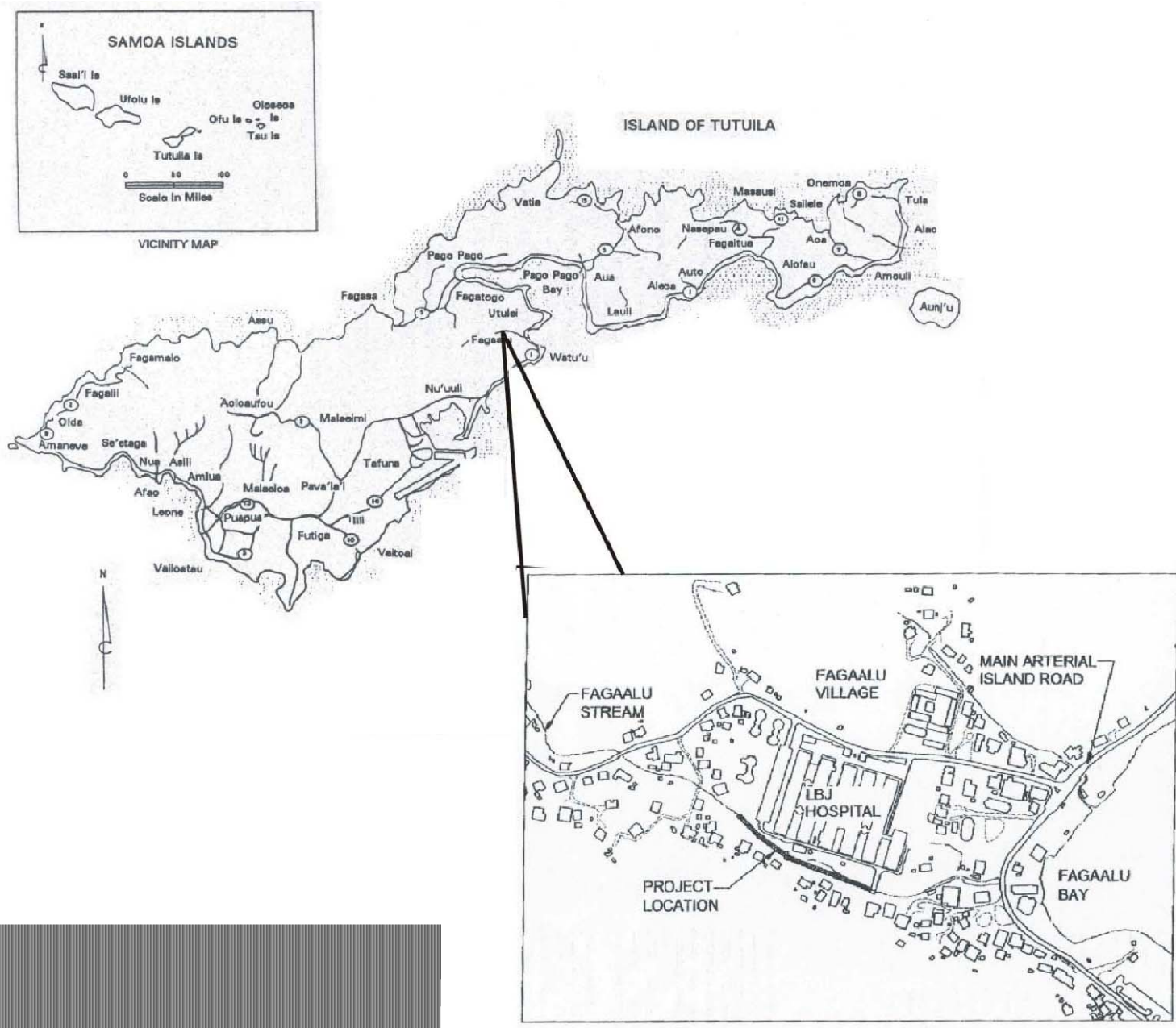
The EA process provides steps and procedures to evaluate the potential environmental, social, and economic impacts of a Proposed Action and alternatives, as well as an opportunity for the public and local, state/territorial, and other federal agencies to provide input and/or comment through scoping studies and a public comment period. These potential impacts are measured by their context and intensity, as defined in the CEQ regulations.




The PDM Program assists states/territories and communities to implement sustained, pre-disaster, natural-hazard mitigation programs to reduce overall risk to the population and structures, while also reducing reliance on funding from actual disaster declarations. Therefore, the purpose of the action is to provide PDM Program funding to TEMCO.

During the Presidentially declared disaster of May 2003, overbank flooding of Faga’alu Stream, adjacent to the Lyndon B. Johnson Tropical Medical Center (LBJ Medical Center) in Faga’alu Village, caused considerable damage to many LBJ Medical Center buildings and their contents. Faga’alu Village is located on the island of Tutuila, American Samoa (Figure 1). The May 2003 flooding necessitated the relocation of many patients and the closure of some medical wards for several days. As the LBJ Medical Center is the only major medical facility serving American Samoa, TEMCO has identified the need to reduce the flood hazard on Faga’alu Stream by the LBJ Medical Center as one of its highest priorities. Therefore, action is needed to reduce the flood hazard to the LBJ Medical Center.

Y:\FEMA\Pre-Disaster Mitigation Projects\Fagaalu Village\CAD\SITE PLAN.dwg



		Project No. 15296375	LOCATION	FIGURE 1
		FAGAALU STREAM MODIFICATION		

TEMCO evaluated several alternatives for reducing flooding of the LBJ Medical Center due to the overflow of Faga'alu Stream.

### **3.1 ALTERNATIVES NOT CARRIED FORWARD**

To reduce the threat of property damage and reduce threats to public health and safety caused by the inundation of portions of the LBJ Medical Center by floodwaters of Faga'alu Stream, TEMCO considered relocating the hospital and appurtenant facilities or rerouting Faga'alu Stream away from the LBJ Medical Center. However, due to topographic and economic constraints, neither of these alternatives was considered feasible.

### **3.2 ALTERNATIVES CARRIED FORWARD**

#### **3.2.1 Alternative 1: No Action**

Inclusion of a No Action Alternative in the environmental analysis and documentation is required under NEPA. The No Action Alternative is defined as maintaining the status quo with no FEMA funding for any alternative action. The No Action Alternative is used to evaluate the effects of not providing eligible assistance for the project, thus providing a benchmark against which "action alternatives" may be evaluated. For the purpose of this alternative, it is assumed that TEMCO would be unable to implement the Proposed Action for lack of federal assistance, and a flood hazard would remain unmitigated at the project site. Economic losses from flood damage would occur on a periodic basis. Adverse environmental, health, and safety effects resulting from flooding would not be mitigated.

#### **3.2.2 Alternative 2: Proposed Action**

TEMCO would modify approximately 1,100 linear feet of Faga'alu Stream to improve hydraulic performance, as shown on Figure 2. Prior to the start of the Proposed Action, a rock check dam would be constructed at the downstream end of the project reach to create a settling basin as a best management practice (BMP) to reduce turbidity generated during project construction. TEMCO would also remove trees, shrubs, debris, rocks, and other obstructions from the existing stream. The staging area for construction equipment and materials would be sited at the parking lot on the western side of the LBJ Medical Center. Construction equipment is expected to consist of two excavators, one front-end loader, one backhoe, and one dump truck. A concrete batching plant may also be used should the need arise for on-site batching of concrete for the two proposed bridges, as described below.

Stage 1 of the project consists of modification to the existing channel in the upstream portion of the project reach, which includes approximately 20 feet of a tributary stream at its confluence with Faga'alu Stream. The south bank and the streambed would be excavated, graded, shaped, and compacted, followed by the placement of geotextile filter fabric and new bedding rock. Stream flow would temporarily be directed along the northern side of the channel using a coffer dam. Rock-filled gabion mattresses would be placed along the southern side of the channel. Upon completion of the southern side of the channel, the stream would be diverted to the south using a coffer dam, and work on the northern side of the channel would be carried out. Two

layers of 24-inch stone riprap would be placed at the interface between the nonmodified section of streambed and the newly upgraded streambed.

A 3-foot-deep concrete cut-off wall would be constructed at the termination of the new gabion mattresses. Figure 3 shows a cross section of the completed stream modification.

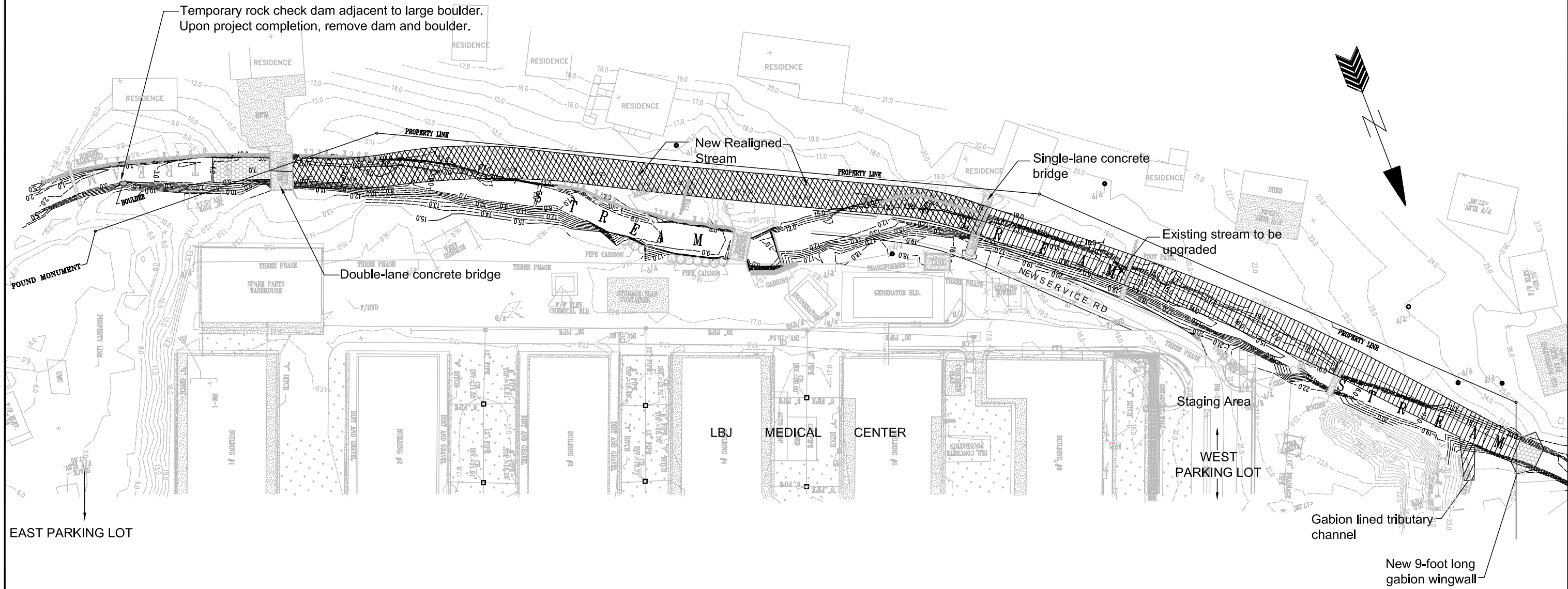
Stage 2 involves realignment of an existing portion of Faga'alu Stream. The new channel would be excavated out of the mid-portion of the project area to the south of an existing bend in the stream, leaving the existing stream embankments intact at both ends of the alignment. The newly excavated channel would be graded, shaped, and compacted, followed by placement of geotextile filter fabric and new bedding rock. Rock-filled gabion mattresses would be placed on the bedding, and gabion embankment walls would be constructed. The downstream barrier embankment would then be removed and work would proceed upstream as described above for Stage 1, followed by removal of the upstream barrier embankment. Material excavated during Stage 2, approximately 2,700 cubic yards (CY), would be stockpiled at an upland site.

Approximately 2,100 CY of this material would be used to fill in the original stream channel at the end of this stage of the work after flow is established in the new channel. Approximately 0.15 acre of the existing stream would be filled for realignment.

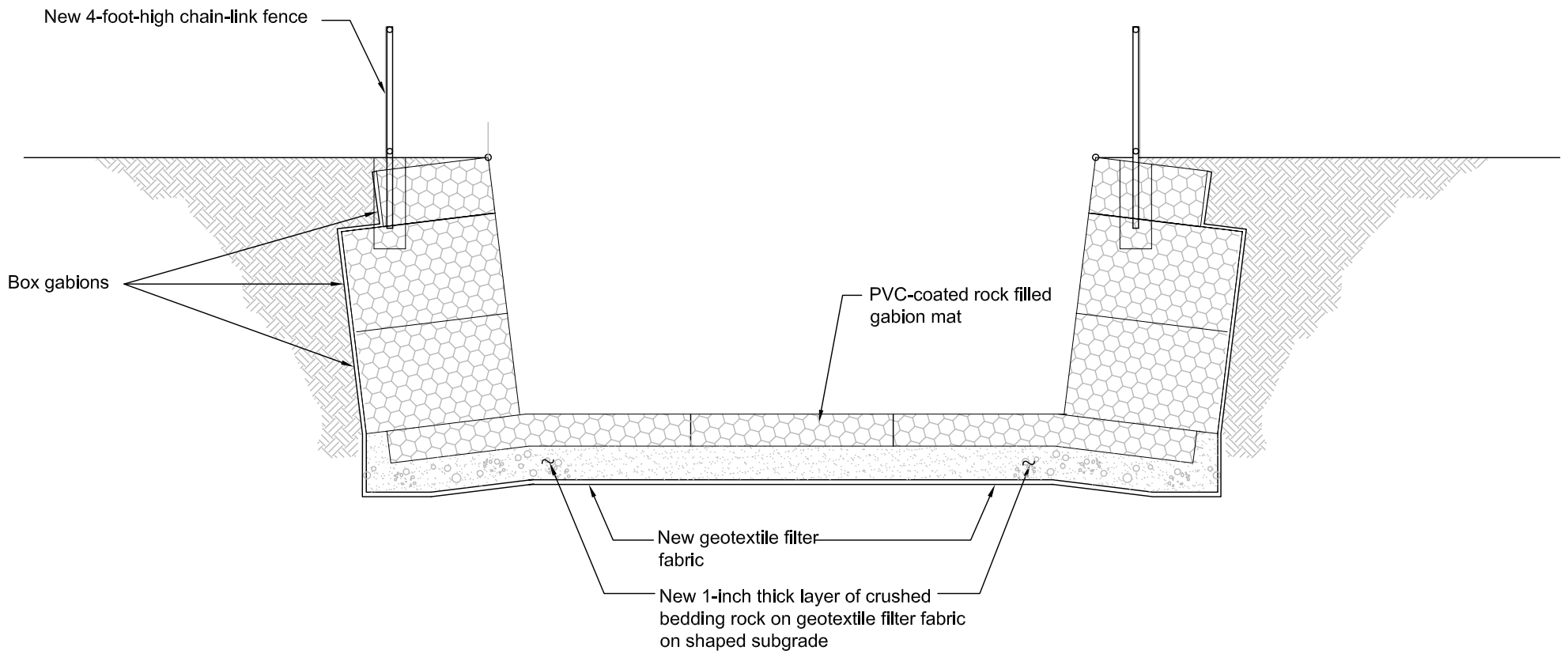
Stage 3 involves work at the lower (downstream) end of the project reach. The temporary rock check dam would be removed to allow work to proceed in this area. Stage 3 includes excavation, shaping, and compaction of subgrade material; placement of geotextile filter fabric and rock bedding; and construction of gabion mattresses. New gabion embankment walls would be constructed. An existing concrete bridge would remain. Two layers of 24-inch-diameter riprap would be placed on shaped and compacted subgrade material and geotextile filter fabric. An existing rock outcrop would be removed and the embankment shaped and faced with new riprap. A 3-foot-deep concrete cut-off wall would be constructed at the beginning of the new gabion mattresses (at a point coinciding with the downstream edge of the existing bridge abutment).

After the stream modification is complete, TEMCO would replace one single-lane concrete slab bridge and one double-lane concrete slab bridge to provide access from the LBJ Medical Center parking lot to the residences on the southern side of the stream. Finally, TEMCO would construct a concrete traffic-barrier wall and chain-link fence on the LBJ Medical Center side of the stream and a chain-link fence on the residential side of the stream for pedestrian and vehicular safety.

Overall, the project would involve the discharge of approximately 7,000 CY of fill material, consisting of excavated material (3,100 CY), bedding rock (850 CY), rock-filled gabions (2,900 CY), riprap (80 CY), and concrete (75 CY), and the placement of approximately 4,100 square yards of geotextile filter fabric.



Y:\FEMA\Pre-Disaster Mitigation Projects\Fagaalu Village\CAD\FIGURE 3.dwg



**URS**

Project No. 15296375

FAGAALU STREAM  
MODIFICATION

TYPICAL MODIFIED STREAM  
CROSS SECTION

FIGURE

3

This section describes existing conditions in the project area, evaluates the potential for the No Action Alternative and the Proposed Action to result in direct and indirect impacts on the environment, and discusses mitigation measures to avoid or minimize these impacts. This section focuses on the environmental resources for which some level of impact may result: geology, seismicity, and soils; air quality; water resources; biological resources; cultural resources; socioeconomics and safety; land use and planning; transportation; noise; and visual resources. No other resource areas require evaluation pursuant to NEPA.

## **4.1 GEOLOGY, SEISMICITY, AND SOILS**

### **4.1.1 Geology**

The island of Tutuila is of volcanic origin and is characterized by steep mountainsides, small valleys, and a narrow coastal fringe of relatively level land. The island is a narrow mountain range consisting of basic igneous rock, mainly basalt and small amounts of andesite and trachyte. The mountains extend from east to west and are approximately 20 miles long, have a maximum width of 6 miles, and a minimum width of 0.75 mile at Pago Pago Harbor. The highest peak is 2,142 feet tall and from the mountain ridgetops the land slopes steeply to the ocean. Relief is approximately 2 percent slope in the project area, and the site generally slopes south-southeast toward the ocean. Geologic hazards on Tutuila include volcanic eruptions and earthquakes, landslides, and tsunamis.

The only currently active volcano in the American Samoa region is the submarine volcano Vanilulu'u. The Ofu-Olosega volcano last erupted in 1866, and the other volcanoes in the region have been silent for thousands of years. In 1995 a shallow earthquake was recorded in the region of the Vanilulu'u submarine volcano. These events are precursors to potential volcanic activity and are generally not a threat to the islands in regards to earthquakes.

Landslides occur on the island in response to heavy rainfall that saturates unstable earth. In addition to the influence of topography, landslides are aggravated by human activities such as deforestation, cultivation, and construction that destabilize slopes. As a result of the combined actions of natural (mostly heavy rainfall) and human-induced factors, landslides have a high potential to occur on Tutuila.

Most tsunamis (huge water waves) that affect Tutuila are generated by earthquakes from fault movements along the Pacific Rim in places such as the Aleutian Islands, South America, and the Tonga Trench. In 1868 and 1960, Chilean-originating tsunamis caused damage in the Samoan islands. The National Oceanic and Atmospheric Administration National Weather Service operates the Pacific Tsunami Warning Center that monitors sudden earth movements throughout the Pacific Basin. Warnings are broadcast by the news media on radio and television.

#### **4.1.1.1 *Alternative 1: No Action***

Under the No Action Alternative, no impacts would occur to the existing geology and geologic hazards.



**4.1.1.2     *Alternative 2: Proposed Action***

Under the Proposed Action Alternative, no impacts would occur to geology, and the potential for volcanic eruptions, landslides, tsunamis, and earthquakes remains unchanged. Implementation of the Proposed Action would not alter existing evacuation routes for residents during a natural disaster. Topography and geomorphology at the project site would not be impacted by implementation of the Proposed Action.

**4.1.2        Seismicity**

Earthquakes in American Samoa originate from the Tonga Trench, approximately 100 miles southwest of Tutuila. The Tonga Trench is located where the Pacific and Australian tectonic plates collide and is considered an area of high seismic activity and is a source of large but distant earthquakes felt on Tutuila. American Samoa does not have any seismic recording instruments and all seismic recordings are measured from the Independent State of Samoa located 50 miles away.

The island of Tutuila is classified by FEMA as Seismic Zone 3, which means it will experience earthquake ground shaking of approximately 0.2g peak horizontal acceleration, and light-to-moderate building damage one chance in 500 per year (10 percent probability of experiencing at least 0.2g every 50 years). This Seismic Zone 3 designation considers all probable earthquake sources affecting American Samoa, local and distant, and translates their effects into different estimates of ground shaking.

Executive Order 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction, requires construction of new buildings to meet standards for seismic safety set by the National Earthquake Hazard Reduction Program. However, this executive order applies only to construction of new buildings, which are defined as structures used or intended for sheltering persons or property. Because the PDM Program project does not involve new building construction, Executive Order 12699 does not apply.

**4.1.2.1     *Alternative 1: No Action***

Under the No Action Alternative, no impacts would occur to the existing seismicity.

**4.1.2.2     *Alternative 2: Proposed Action***

Under the Proposed Action Alternative, the potential for an earthquake remains unchanged. An earthquake of 0.2g is unlikely to affect the proposed stream channel improvements. Evacuation routes are not altered by implementation of the Proposed Action.

**4.1.3        Soils**

The soils in the project area are Aua very stony silty clay loam and Leafu silty clay (United States Department of Agriculture 1983). They are characterized by high organic matter contents in the surface horizon and silty clay loam and silty clay surface textures. The soils are formed in colluvium and alluvium derived dominantly from basic igneous rock, and rooting depths are typically 60 inches or greater. The subsoil may be stony in places. Due to gentle slopes and clay textures, the soils have slow to medium runoff rates and slight to moderate susceptibility to water



erosion. The soils are subject to occasional, brief periods of flooding during prolonged, heavy rainfall.

Some soils in the immediate vicinity of the LBJ Medical Center are comprised of coarse sands overlying silty loams at depth (Tinai, Gordon & Associates 2002). The sands were dredged from Faga'alū Bay and deposited on site during the mid-1960s in preparation for construction of the hospital.

#### **4.1.3.1     *Alternative 1: No Action***

Under the No Action Alternative, no impacts would occur to the existing geology or soils. Future flooding would erode soils in the project area or deposit soils from upstream in the project area.

#### **4.1.3.2     *Alternative 2: Proposed Action***

Soils would be temporarily impacted by implementation of the Proposed Action. Construction activities such as grading, removal of vegetation, and the presence of heavy equipment may cause compaction and leave soils exposed and susceptible to water and wind erosion. Areas that would be disturbed by construction activities would be stabilized with erosion control measures to reduce any erosion that might occur. TEMCO would construct a check dam and silting basin and employ BMPs such as installing silt fences or mulching cleared soil to eliminate or reduce soil erosion during construction activities. TEMCO would implement permanent erosion control measures such as revegetation with native species when construction is completed. Soil that is stockpiled on site for use as fill or that has been excavated from the project area would be covered, and a sediment barrier would be used around the pile to prevent the loss of sediment.

## **4.2           AIR QUALITY**

The Clean Air Act is a comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. It authorizes the U.S. Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQSs) to protect public health and the environment. The NAAQSs include standards for the following five criteria pollutants: nitrogen dioxide, ozone, carbon monoxide, sulfur dioxide, and particulate matter less than 10 micrometers in diameter. In addition, new NAAQSs for ozone and particulate matter less than 2.5 micrometers in diameter have not yet been implemented. Areas where the monitored concentration of a pollutant exceeds the NAAQS are classified as being in nonattainment for that pollutant. If the monitored concentration is below the NAAQS, the area is classified as being in attainment.

American Samoa is classified as being in attainment or is unclassified for carbon monoxide, ozone, and nitrogen dioxide, and in attainment for sulfur dioxide. Attainment status for particulate matter less than 10 micrometers in diameter has not been addressed and is unclassified. Attainment designations for particulate matter less than 2.5 micrometers in diameter have not yet been determined. The American Samoa air quality district requires preconstruction permits for stationary sources but does not have authority to issue permits for mobile sources (such as construction vehicles and equipment).

In 1971, the American Samoa Environmental Quality Commission was established, and a State Implementation Plan was developed. Because American Samoa is in attainment or is unclassified

for all criteria pollutants, the plan has not been updated. In addition, because American Samoa is in attainment or is unclassified for all criteria pollutants, the General Conformity Rule does not apply.

#### **4.2.1 Alternative 1: No Action**

Under the No Action Alternative, air quality standards would not be directly affected. However, the flooding in May 2003 caused considerable damage to many LBJ Medical Center buildings and caused the relocation of many patients and the temporary closure of many buildings. These types of disasters can indirectly create air pollution due to patient relocations, clean up, and building repair. Support vehicles used to clean up deposited sediment and debris would cause a slight, temporary increase in fugitive dust (that is, airborne particulate matter of a relatively large size). The use of support vehicles would also result in minor emissions associated with fossil fuel burning, including carbon monoxide and precursors to ozone.

#### **4.2.2 Alternative 2: Proposed Action**

Implementation of the Proposed Action would result in minor, short-term deterioration of air quality. The construction-related effects of the project would be limited to increases of fugitive dust and mobile construction equipment emissions during construction.

Construction-related fugitive dust would be generated by a dump truck, delivery trucks, and other earth-moving vehicles operating at and near the construction site. The fugitive dust would result primarily from particulate matter resuspended by excavation and debris removal at the construction site, vehicle movement, dirt tracked onto paved surfaces from unpaved areas at access points, and material blown from uncovered haul trucks. These vehicles would also release minor emissions associated with fossil fuel burning, including carbon monoxide and precursors to ozone.

Emissions during construction activities were calculated due to the proximity of homes and businesses near the project area. Emissions from construction equipment were estimated using factors from the *California Environmental Quality Act Guidelines*, Tables A9-8A and A9-8B (South Coast Air Quality Management District 1993). These factors and estimates of equipment usage for the construction period were used to calculate daily emissions. Emission estimates were based on an 8-hour day and assumed a 50 percent load factor (i.e., each piece of equipment would be used 4 hours per day). Annual emission totals assume the project would take 52 weeks to complete, and all equipment would be used for the entire period, except for the batch plant, which would be used for 4 weeks. Emission estimates are summarized in Table 1.

**Table 1**  
**Air Quality Emissions from Construction Equipment**

Equipment Description	Carbon Monoxide	Oxides of Nitrogen	Oxides of Sulfur	PM <sub>10</sub>
<b>Emission Factors (pounds/hour)</b>				
Excavator	0.011	0.024	0.002	0.0015
Loader	15.57	0.518	0.023	0.03
Backhoe	0.015	0.022	0.002	0.001
Dump truck	1.8	4.17	0.45	0.26
Cement batch plant	0.33	1.55	0.10	0.16
<b>Emissions Estimates (pounds/day)</b>				
Excavator	0.088	0.192	0.016	0.012
Loader	62.28	2.072	0.092	0.12
Backhoe	0.06	0.088	0.008	0.004
Dump truck	7.2	16.68	1.8	1.04
Cement batch plant	1.32	6.2	0.4	0.64
Total	70.95	25.23	2.32	1.82
<b>Emissions Estimates (tons/year)</b>				
Total	9.06	2.51	0.25	0.16

Assuming construction at these daily rates would continue for a full year, total emissions would fall well below “significant emissions” thresholds established under the USEPA’s Prevention of Significant Deterioration program at 40 CFR 51.166(b)(23)(i). Emissions below these thresholds would not cause or contribute to a violation of a NAAQS. To further minimize air quality impacts, TEMCO would employ the following measures to limit emissions, fugitive dust, and exhaust: maintaining and covering spoil piles, covering the load of haul vehicles containing fill or cut, and keeping construction equipment properly tuned.

### 4.3 WATER RESOURCES

Faga’alu Stream flows along the south boundary of LBJ Medical Center (Figure 2), generally in a west-to-east direction, and discharges into Faga’alu Bay approximately 0.5 mile from the project area. Faga’alu Stream begins at about the 1,400-foot contour level between Palapalaoa Mountain and Matafao Peak west of the LBJ Medical Center. The Faga’alu watershed is approximately 0.96 square mile. Faga’alu Stream flows year-round, often in response to heavy precipitation events that are common on Tutuila. The climate is rainy year-round, rain occurs on about 50 percent of the days of the year. The mountainous areas of the island receive approximately 200 inches of rain per year, the larger proportion of that coming during the wet season between the months of October and May.

#### 4.3.1 Coastal Zone Management Act

The entire island of Tutuila is within the coastal zone as designated by the American Samoa Coastal Management Program (ASCMP). The federal consistency provisions of the Coastal Zone Management Act require that all federally funded, licensed, or permitted projects affecting the coastal zone be conducted in a manner that is consistent with the state or territory’s coastal zone

management plan, in this case the ASCMP. The LBJ Medical Center received a federal consistency certification from the American Samoa Department of Commerce (ASDOC) for a project similar to the Proposed Action in August 2003.

#### **4.3.1.1     *Alternative 1: No Action***

Under the No Action Alternative, no impacts would occur to the coastal zone as designated by the ASCMP. Future flooding would wash soils and debris into Faga'alu Bay.

#### **4.3.1.2     *Alternative 2: Proposed Action***

TEMCO would be responsible for applying for and obtaining a federal consistency certification from the ASDOC with the finding that the Proposed Action would be conducted in a manner consistent with ASCMP. Impacts to coastal resources would be minimized by the application of mitigation measures described in Section 4.1.3.2 and 4.3.3.2 of this EA. In the long-term, the Proposed Action would benefit the coastal zone by allowing floodwaters to flow through the project area without carrying soil and debris from the LBJ Medical Center grounds.

### **4.3.2        Flood Hazards**

FEMA (1991) has published a Flood Insurance Rate Map for the project area. According to this map, the project area is within Zone AE, which is within the 100-year floodplain. Base flood elevations (BFEs) for the project area are between 11 feet and 22 feet above mean sea level.

The United States Army Corps of Engineers (USACE) Pacific Ocean Division (American Samoa Government 1996) performed a detailed analysis of Faga'alu Stream, and calculations of peak discharges were made at the stream mouth and at its upstream study limit northwest of the LBJ Medical Center. A 100-year peak discharge of 1,720 cubic feet per second was estimated at the mouth of Faga'alu Stream, and 920 cubic feet per second was calculated as the 100-year peak discharge for the upper study limit downstream of the Samoa Maritime quarry.

Tinai, Gordon & Associates (2002) performed a hydraulic analysis of Faga'alu Stream under natural conditions. Runoff data for selected storm recurrence intervals are presented for the stream within the project area in Table 2. The hydraulic analysis shows that flooding of the LBJ Medical Center property and residential properties located south of Faga'alu Stream from the hospital occurs for 2-year storm events and greater.

**Table 2**  
**Maximum Flood Depths of Faga'alu Stream, Existing Conditions**

<b>Storm Recurrence Interval (years)</b>	<b>Natural Channel Maximum Calculated Flood Depth (feet)</b>
2	4.96
10	6.14
20	6.37
50	6.54
100	6.66

Executive Order 11988, Floodplain Management, requires federal agencies to avoid, to the extent possible, the short- and long-term adverse impacts associated with the occupancy and modification of floodplains. FEMA's regulations for complying with Executive Order 11988 are found at 44 CFR Part 9.

#### **4.3.2.1    *Alternative 1: No Action***

Under the No Action Alternative, impacts would continue to occur within the existing floodplain. Floodwaters would continue to periodically inundate the LBJ Medical Center and adjacent roadways, resulting in sediment deposition, property damage, impacts to water quality, disruption of medical service, threats to health and safety, and socioeconomic losses.

#### **4.3.2.2    *Alternative 2: Proposed Action***

Table 3 compares the existing conditions in the channel and the expected flood depths after implementation of the Proposed Action. The Proposed Action would allow a storm event between the 50-year and 100-year flood to pass through the channel, in the project area, without flooding. Tinai, Gordon & Associates (2002) concluded that the Proposed Action channel modifications would increase flow velocities and lower water-surface elevations within the LBJ Medical Center property and "realignment of the proposed channel section would eliminate flooding of neighboring properties while having minimal impact on downstream conditions." The Proposed Action would also depress water-surface levels during flood events for approximately 200 feet upstream of the project area.

**Table 3**  
**Maximum Flood Depths of Faga'alu Stream, Post-Project Conditions**

<b>Storm Recurrence Interval (years)</b>	<b>Natural Channel Maximum Calculated Flood Depth (feet)</b>	<b>Modified Channel Maximum Calculated Flood Depth (feet)</b>
2	4.96	3.7
10	6.14	4.64
20	6.37	5.08
50	6.54	5.64
100	6.66	6.07

In compliance with Executive Order 11988, FEMA considered the Proposed Action's impacts to the floodplain. FEMA applies the Eight-Step Decision-Making Process to ensure that it funds projects consistent with EO 11988. The NEPA compliance process involves essentially the same basic decision-making process to meet its objectives as the Eight-Step Decision-Making Process. Therefore, the Eight-Step Decision-Making Process has been applied through implementation of the NEPA process. FEMA published an Initial Public Notice at the declaration of the disaster. FEMA would ensure publication of a Final Public Notice in compliance with Executive Order 11988 before implementation of the Proposed Action.

The functional nature of the project requires that it be located in the floodplain. No adverse impacts to floodplain values have been identified. The Proposed Action is not expected to support additional development of the floodplain because the Proposed Action is not expected to remove property from the 100-year floodplain: LBJ Medical Center or private residents would still have to elevate structures above the BFEs. A comparison of existing and post-project water surface elevations for the 100-year flood shows that the Proposed Action does not cause an increase in BFEs with one exception: Station 12+20. Therefore, TEMCO would have to refine the channel design to remove this modeled increase in the BFE or apply for a conditional Letter of Map Revision. With implementation of these measures, the Proposed Action would comply with Executive Order 11988.

USACE HEC-RAS modeling shows flow at critical depth throughout much of the channel for the 50- and 100-year floods, meaning that any debris or blockage in the channel could cause increases in flood depth and overflow outside the channel. Failure to maintain the channel could result in significant flooding for larger events. Therefore, TEMCO would be responsible for preparation and implementation of a maintenance plan to keep the channel free from debris, dense vegetation, and other objects that could block the channel.

#### **4.3.3 Water Quality**

The American Samoa Environmental Protection Agency (ASEPA) maintains programs in water quality and drinking water under the American Samoa Office of the Governor. The ASEPA has identified three major water quality concerns on Tutuila: (1) sedimentation from improper land use practices that pours into streams and coastal waters after heavy rains, (2) nutrient enrichment from human and animal wastes in populated areas, and (3) contamination in Pago Pago Harbor, which Faga'alu Bay empties into.

Of most concern is the water quality in Pago Pago Harbor. In 1991, the ASEPA determined that there were elevated levels of various heavy metals and pesticides were present in the fish, seawater, and sediment in the inner portion of Pago Pago Harbor. Coral reefs surrounding Tutuila are also impacted by poor water quality. Natural phenomena like hurricanes and disease have always taken their toll on reefs, but their effects are exacerbated by human activities in the ocean and on land. Besides destructive fishing practices and coral collecting, impacts come from sewage and other effluents and from sediments eroded from agricultural and construction operations.

Potential groundwater contamination is another concern on Tutuila. However, in Faga'alu Village, the steep topography generally does not allow sufficient time for groundwater recharge, so no major aquifer exists in the project area.

Faga'alu Stream is considered a jurisdiction water of the United States. Section 404 of the Clean Water Act requires that project proponents receive a U.S. Department of the Army permit for work involving the discharge of dredged or fill materials in waters of the United States. USACE is responsible for reviewing projects for Department of Army permits. Section 401 of the Clean Water Act requires that applicants for federal permits or licenses to conduct work involving any discharge into waters of the United States receive a Water Quality Certification. ASEPA is responsible for reviewing projects for Water Quality Certification. The LBJ Medical Center received a Water Quality Certification from ASEPA for a project similar to the Proposed Action in September 2003.

#### **4.3.3.1    *Alternative 1: No Action***

Under the No Action Alternative, existing water quality conditions would not be changed. Potential water quality impacts to Faga'alu Stream, Faga'alu Bay, and Pago Pago Harbor from land-borne contaminants such as garbage, sediment, and hospital materials and wastes that are mobilized by floodwaters and discharged into the creek would continue.

#### **4.3.3.2    *Alternative 2: Proposed Action***

In the long-term, implementation of the Proposed Action would improved water quality due to most flood flows staying in the channel instead of inundating developed areas where floodwaters would mobilize pollutants such as oil and grease, debris, suspended sediments, and hospital materials and wastes. The Proposed Action would, therefore, have a beneficial impact on surface water quality in Faga'alu Stream and Faga'alu Bay. It is not anticipated that the Proposed Action would result in impacts to groundwater quality.

TEMCO would construct a check dam and silting basin and implement BMPs including preparing and implementing an erosion control plan to reduce potential erosion from construction activities. Other BMPs may include but are not limited to use of silt fencing, covering stockpiled soils, mulching cleared areas, and revegetating with native species.

TEMCO would be required to apply for and obtain a Department of Army Permit from the USACE in compliance with Section 404 of the Clean Water Act. TEMCO would also be required to apply for and obtain a Water Quality Certification from ASEPA in compliance with Section 401 of the Clean Water Act.

### **4.4            BIOLOGICAL RESOURCES**

Biodiversity of terrestrial species in American Samoa is low due to the islands' remote locations, while their surrounding marine environment is extremely diverse. Most of their native species are closely related to Indonesia's (Craig 2002). These islands have many pests and approximately 250 nonnative vascular plants (Craig 2002).

The main vegetation type found on Tutuila is tropical rainforest. However, many nonnative plants were introduced and have outcompeted the native plants in disturbed environments (Whistler 1995). A narrow ring around the island consists of shallow coastal habitats that support coral reef ecosystems. The deepwater habitats are steep and reach depths of 2,000 feet within 0.5 to 2 miles from the coast (Craig 2002).

The project area consists of an urbanized riparian area, dominated by nonnative species. However, the project area is in close proximity to undeveloped rainforest to the south. The Samoan rainforest has a wide variety of native and nonnative plant species. Trees include two species of native banyan trees (or *aoa*) (*Ficus prolixa* and *F. oblique*), a nonnative banyan tree (*pulu* or Mexican rubber tree; *Castilla elastica*), *fetau* (*Calophyllum inophyllum*), the nonnative *ifi* or Polynesian chesnut (*Inocarpus fagifer*), and native species such as *a'amati'e* (*Elaeocarpus floridanus*), *asi* (*Syzygium inophylloides*), and *tava* or island lychee (*Pometia pinnata*). Some areas on the island may be dominated by *togo* or mangroves (*Rhizophora mangle* and *Bruguiera gymnorrhiza*). Other fruit trees include *gasu* (*Palaquium stehlinii*), *ulu* or breadfruit (*Artocarpus altilis*), *atone* or nutmeg (*Myristica inutilis*), and *moso'oi* or perfume tree (*Cananga odorata*).

Some of the native wildlife found in this tropical rainforest includes the Samoan fruit bat (*Pteropus samoensis*), white-naped fruit bat (*Pteropus tonganus*), sheath-tailed bat (*Emballonura semicaudata*), pelagic gecko (*Cyrtodactylus pelagicus*), Polynesian gecko (*Gehyra oceanica*), mourning gecko (*Lepidodactylus lugubris*), stump-toed gecko (*Peropus mutilatus*), snake-eyed skink (*Ablepharus boutonii*), Micronesian skink (*Emoia adspersa*), Azure-tailed skink (*Emoia cyanura*), Lawes skink (*Emoia lawesii*), black skink (*Emoia nigra*), Samoan skink (*Emoia samoensis*), and moth skink (*Lipinia noctua*).

Stream edges in Tutuila are typically dominated by *Brachiaria mutica*, *Coix* sp. and *Canna* sp., as well as many other weedy species found in taro patches (Volk 1991). Urbanized or agricultural areas near streams frequently have mango (*Mangifera indicata*), coconut (*Cocos nucifera*), papaya (*Carica papaya*), banana (*Musa paradisiacal*), and fig (*Ficus* spp.). *Barringtonia samoensis*, a medium-sized tree closely related to the dominant coastal forest tree *Barringtonia asiatica*, is commonly found along mountain streams (Volk 1991).

Several species have been introduced from Polynesian islands or simply modern introductions. Some of those introduced wildlife species include three species of rats, the house mouse (*Mus musculus*), pigs (*Sus scrofa*), domesticated dogs (*Canis familiaris*), feral cats (*Felis domesticus*), the house gecko (*Hemidactylus frenatus*), the blind burrowing snake (*Typhlops braminus*), and the marine toad (*Bufo marinus*).

The project area consists mainly of disturbed and developed land. Mesquite (*Prosopis pallida*), coconut trees, banana trees, and a large banyan occur in the project area. The understory is made up of, among others, the convolvulaceae (morning-glory), asteraceae (sunflower), and malvaceae (mallow) families. Other notable ornamentals include Chinese hibiscus (*Hibiscus rosa-sinensis*) and red ginger (*Alpinia purpurata*).

#### 4.4.1 Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 establishes a federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. Section 7 of the ESA specifically charges federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All federal agencies must ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction of critical habitat for these species.

FEMA obtained information concerning species listed as endangered, threatened, proposed for listing as endangered or threatened, or candidates for listing as endangered or threatened under the ESA that may occur in the project area. Table 4 identifies four sea turtles species that are federally listed under the ESA. However, the project area does not provide habitat to support any of these federally listed species. No other species protected under the ESA are known or expected to occur in American Samoa.



**Table 4**  
**Special-Status Species with Potential to Occur in American Samoa**

Scientific Name	Common Name	Federal Status	Preferred Habitat	Likelihood of Occurrence in Project Area
<i>Caretta caretta</i>	Loggerhead sea turtle	T	Open ocean. Nests in sandy beaches.	No potential because suitable habitat is not present in the project area.
<i>Chelonia mydas</i>	Green sea turtle	T	Open ocean. Nests in sandy beaches.	No potential because suitable habitat is not present in the project area.
<i>Dermochelys coriacea</i>	Leatherback sea turtle	E	Open ocean. Nests in sandy beaches.	No potential because suitable habitat is not present in the project area.
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	E	Open ocean. Nests in sandy beaches.	No potential because suitable habitat is not present in the project area.

T = threatened, E = endangered

#### 4.4.1.1 *Alternative 1: No Action*

Under the No Action Alternative, no impacts would occur to federally listed threatened or endangered species.

#### 4.4.1.2 *Alternative 2: Proposed Action*

The Proposed Action would not adversely affect any federally listed species because habitat suitable to support any of the species identified in Table 4 is not present in the project area. Implementation of BMPs, as previously described, would limit temporary impacts to the marine environment downstream of the project area, where protected turtles have the potential to occur. Permanent impacts of the Proposed Action would benefit marine waters used by protected turtles by reducing deposition of debris and sediment in Faga'alu Bay. The Proposed Action would comply with Section 7 of the ESA.

#### 4.4.2 Executive Order 13112: Invasive Species

Under Executive Order 13112, dated February 3, 1999, projects that occur on federal lands or are federally funded must be “subject to the availability of appropriations, and within administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to, and control, populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; and (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded.”

As described in Section 4.4, many invasive species currently occur in the project area.

#### 4.4.2.1 *Alternative 1: No Action*

Under the No Action Alternative, no impacts would occur to invasive species.

#### **4.4.2.2     *Alternative 2: Proposed Action***

Under the Proposed Action, vegetation would be cleared from the construction area, including invasive and native species. TEMCO would attempt to retain the large banyan tree in the downstream reach of the project area. The remaining vegetation in the project area would be removed. Upon completion of the Proposed Action, the cleared areas would be revegetated with native species, thus decreasing invasive species in the project area. TEMCO would ensure that any imported fill or other construction materials would be certified as being free from containing invasive species.

#### **4.4.3        Executive Order 11990: Protection of Wetlands**

Executive Order 11990 requires federal agencies to take action to minimize the destruction or modification of wetlands by considering both direct and indirect impacts to wetlands that may result from federally funded actions.

Faga'alu Stream is considered an intermittent, riverine streambed wetland. Work involving dredging or filling wetlands is subject to Section 404 of the Clean Water Act, as described in Section 4.3.3. In a Department of Army permit application, LBJ Medical Center determined that a project similar to the Proposed Action would result in 0.15 acre of wetlands being filled.

##### **4.4.3.1     *Alternative 1: No Action***

Under the No Action Alternative, no impacts would occur to wetlands.

##### **4.4.3.2     *Alternative 2: Proposed Action***

In compliance with Executive Order 11990, FEMA considered the Proposed Action's impacts to wetlands. FEMA applies the Eight-Step Decision-Making Process to ensure that it funds projects consistent with EO 11990. The NEPA compliance process involves essentially the same basic decision-making process to meet its objectives as the Eight-Step Decision-Making Process. Therefore, the Eight-Step Decision-Making Process has been applied through implementation of the NEPA process. FEMA published an Initial Public Notice at the declaration of the disaster. FEMA would ensure publication of a Final Public Notice in compliance with Executive Order 11990 before implementation of the Proposed Action.

The functional nature of the project requires that it affect wetlands. Approximately 0.15 acre of wetlands are expected to be impacted. TEMCO would be required to apply for and obtain a Department of Army Permit from the USACE in compliance with Section 404 of the Clean Water Act. TEMCO would minimize the disturbance to wetlands to only those portions of the channel necessary to complete the project. With implementation of these measures, the Proposed Action would comply with Executive Order 11988.

#### **4.4.4        Executive Order 13089: Coral Reef Protection**

Executive Order 13089 requires federal agencies to ensure that actions that they authorize, fund, or implement will not degrade coral reef ecosystems. As mentioned in Section 4.4, much of Tutuila is surrounded by a fringing coral reef. Historically, coral has been used as fill and as aggregate in concrete or asphalt mixes.

#### **4.4.4.1     *Alternative 1: No Action***

Under the No Action Alternative, impacts to coral reef ecosystems would occur as they do currently. Sedimentation associated with flood events has the potential to wash into Faga'alū Bay and eventually settle on coral reefs. Sedimentation is a major cause of coral reef degradation.

#### **4.4.4.2     *Alternative 2: Proposed Action***

TEMCO would ensure that coral is not a component of fill materials or used in the concrete batch mixture for the Proposed Action. Because the Proposed Action would reduce sediment flowing into Faga'alū Bay from most storm events, the Proposed Action would have a long-term beneficial impact on the coral reef ecosystem. TEMCO would implement BMPs as previously described to reduce construction-related impacts. Therefore, the Proposed Action would comply with EO 13089.

### **4.5           CULTURAL RESOURCES**

In addition to review under NEPA, consideration of impacts to cultural resources is mandated under Section 106 of the National Historic Preservation Act. Requirements include identifying significant historic properties and districts that may be affected by a federal undertaking and mitigating adverse effects to those resources.

URS Corporation, as a consultant to FEMA, conducted a pedestrian archaeological reconnaissance of the project area on May 12, 2004. The survey was negative for any prehistoric or historic archaeological or built-environment cultural resources. At a meeting with TEMCO and URS on May 13, 2004, the American Samoa Historic Preservation Officer (ASHPO) concurred that no cultural resources appear to exist in the project area. No properties eligible to the National Register of Historic Places are expected.

#### **4.5.1           Alternative 1: No Action**

Under the No Action Alternative, no impacts would occur to cultural resources.

#### **4.5.2           Alternative 2: Proposed Action**

Based on the archaeological survey and conference with ASHPO, FEMA determined the Proposed Action would not affect historic properties. However, the possibility exists that previously unidentified archaeological resources could be discovered during project construction. In the event of an unanticipated discovery, TEMCO would be required to halt work and notify FEMA as soon as practicable. FEMA may require TEMCO to stop construction in the vicinity of the discovery and would require TEMCO to take all reasonable measures to avoid or minimize harm to the property until FEMA concludes consultation with the ASHPO. Should human remains be encountered, TEMCO would be required to halt work in the vicinity and notify the Territorial Coroner. FEMA transmitted a letter to the ASHPO on June 2, 2004, with a notification of its determination and its proposal for treatment of an unanticipated discovery. FEMA assumed ASHPO's concurrence with FEMA's findings based on the ASHPO's lack of a response as of the production of this EA.

## **4.6 SOCIOECONOMICS AND SAFETY**

According to the 2000 Census (U.S. Census Bureau 2003), American Samoa has experienced a population growth of over 22 percent between 1990 (46,773) and 2000 (57,291). While much of the growth has happened in the most densely inhabited island of Tutuila, the population of Faga'alu has remained unchanged over the same period. Census counts taken in April 1990 and April 2000 show the village population at 1,006, or approximately 1.8 percent of the total population in 2000 (U.S. Census Bureau 1992, 2003). Nevertheless, because the topography of the island is steep and large parts of the land are virtually inaccessible, rapid development on some parts of the island has placed considerable demand on coastal areas and along waterways such as Faga'alu Stream. Many homes and businesses are also located along the water, making them directly subject to the effects of flooding and stream sedimentation.

The population in the project area is generally quite young. The median age in American Samoa is about 21.3 years. In Faga'alu, the median age is only slightly higher at 24.4, with less than 11 percent of the population being 62 or older. Throughout American Samoa, including in the village of Faga'alu, over 85 percent of the population is ethnic Samoan. Small fractions of the population are of Asian, White, or other ethnic backgrounds.

According to 2000 Census data, American Samoa has 9,349 households with an average household size of 6.05. The median household income is \$18,219, and the per capita income is \$4,357. Approximately 61 percent of all individuals in American Samoa are living below the poverty level. By comparison, Faga'alu Village has 195 households with an average household size of 5.16. Faga'alu's median household income is comparable to that of the territory at \$18,977, and the per capita income is slightly higher at \$5,685. Fifty percent of the population of Faga'alu is identified as living below the poverty line.

Total employment in American Samoa is estimated at 17,664, or 52 percent of the population over 16 years of age. Approximately 2.7 percent of the population is unemployed. The manufacturing industry is the largest employer, followed by the education, health, and social services; public administration; and retail trade industries. For the most part, the economy of Faga'alu mirrors that of the territory, with a lower unemployment rate (1.2 percent) and a slightly higher proportion of employees in the education, health, and social services industry (26 percent) than manufacturing (24.6 percent).

### **4.6.1 Environmental Justice**

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994, directs federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Demographic data from Faga'alu was studied to determine whether a disproportionate number (defined as greater than 50 percent) of minority or low-income persons have the potential to be affected by the alternatives under review.

**4.6.1.1    *Alternative 1: No Action***

Under the No Action Alternative, the LBJ Medical Center and areas surrounding Faga’alu Stream would continue to be subject to floods. Because no federal action would occur under the No Action Alternative, there is no requirement to comply with Executive Order 12898.

**4.6.1.2    *Alternative 2: Proposed Action***

As described above, the population residing in the project area is principally ethnic Samoan. In addition, 50 percent of the local population lives below the poverty line. Therefore, any impacts associated with the Proposed Action would likely have disproportionate effects on minority and low-income populations. However, no substantial adverse impacts are expected to occur as a result of implementing the Proposed Action. All adverse impacts would be temporary, and TEMCO would implement mitigation measures to minimize these impacts. In general, the Proposed Action would benefit all residents of American Samoa by reducing the potential for flooding at LBJ Medical Center. Therefore, the Proposed Action would comply with Executive Order 12898.

**4.6.2        Public Health and Safety**

The LBJ Medical Center is the only full service medical care facility in American Samoa, and it is located in the project area, within the village of Faga’alu. Although facilities and attending professionals are limited, since 1983 American Samoa has operated a form of Medicaid through which all inpatient and most outpatient services are provided at the LBJ Medical Center at no cost.

**4.6.2.1    *Alternative 1: No Action***

Under the No Action Alternative, the LBJ Medical Center and areas surrounding Faga’alu Stream would continue to be subject to floods. LBJ Medical Center would continue to receive damage from flood events, disrupting the ability to provide medical care during response and recovery activities. Further, flooding in Faga’alu Stream could pose a safety hazard to residents and LBJ Medical Center employees, patients, and visitors.

**4.6.2.2    *Alternative 2: Proposed Action***

Implementation of the Proposed Action would reduce flood damage at LBJ Medical Center, allowing the facility to provide medical services during most storm events. Construction of a chain-link fence on either side of the stream would provide greater public health and safety, directly benefiting local residents and LBJ Medical Center employees, patients, and visitors.

**4.7            LAND USE AND PLANNING**

The project area is urbanized, consisting of residential and institutional/governmental land uses. The Territorial Government of American Samoa owns all land within the project boundaries. All government-sponsored projects must undergo the ASDOC Project Notification and Review System (PNRS), a process that ensures a project is properly permitted and that all government

land use laws and regulations are met. The LBJ Medical Center obtained PNRs approval for a project similar to the Proposed Action in August 2003.

#### **4.7.1 Alternative 1: No Action**

Under the No Action Alternative, no impacts to the existing land ownership or land uses would occur.

#### **4.7.2 Alternative 2: Proposed Action**

All components of the Proposed Action including realignment, construction of two bridges, and all staging areas would be accomplished on land owned by the Territorial Government of American Samoa. No changes in ownership would occur, and no easements or land transfers would be necessary. Implementation of the Proposed Action would not modify the existing land use of the project area. TEMCO would be responsible for applying for and obtaining PNRs approval.

### **4.8 TRANSPORTATION**

An unnamed arterial road from Highway 1 is used to access LBJ Medical Center and the residences on the southern side of Faga'alua Stream adjacent to the project area. LBJ Medical Center has two parking lots used for employees and visitors, and a service road north of Faga'alua Stream that accesses auxiliary hospital buildings south of the main facility. Residents living on the southern side of Faga'alua Stream near the project area currently use single- and double-lane bridges to access their homes by foot and vehicle.

#### **4.8.1 Alternative 1: No Action**

Under the No Action Alternative, access to the LBJ Medical Center and residences on the southern side of Faga'alua Stream would continue to be periodically disrupted during flood events.

#### **4.8.2 Alternative 2: Proposed Action**

Implementation of the Proposed Action and related construction activities would temporarily cause increased traffic on the unnamed arterial road due to workers and haul trucks traveling to and from the project area. TEMCO would ensure that all staging areas, construction equipment, and project-related vehicles would not obstruct traffic at any time to the LBJ Medical Center along the unnamed arterial road, since it is the only ingress/egress route for emergency vehicles, patients, employees, and visitors to the hospital.

The staging area for equipment and a small concrete batch plant would be in the west employee/visitor parking lot and take up approximately 10 to 15 parking spaces on the southern side of the lot. The existing service road behind the hospital would be more congested during project activities but it would remain open at all times. Residents that live south of Faga'alua Stream and travel across bridges that are in the project area would experience the temporary inconvenience of having to use alternate routes to their homes during project construction. Other bridges are located east and west of the project area that can be used to access those homes

during construction activities. In the long-term, access to these properties would be improved during storm events.

## **4.9 NOISE**

Noise is federally regulated by the Noise Control Act of 1972. Although the Noise Control Act tasks the USEPA to prepare guidelines for acceptable ambient noise levels, it only charges those federal agencies that operate noise-producing facilities or equipment to implement noise standards. By nature of its mission, FEMA does not have statutes defining noise.

Certain land uses are sensitive to noise. Noise-sensitive receptors are located at land uses associated with indoor and/or outdoor activities that may be subject to stress or significant interference from noise. They often include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, educational facilities, and libraries. The closest noise-sensitive land use to the project area consists of LBJ Medical Center and residences. Noise sources in the project area are typical of residential and commercial areas—primarily vehicle traffic and air conditioning units.

### **4.9.1 Alternative 1: No Action**

Under the No Action Alternative, noise levels would remain at current levels.

### **4.9.2 Alternative 2: Proposed Action**

Construction noise is unavoidable and could adversely affect nearby residents and people at other noise-sensitive land uses during construction. However, the noise would be temporary and limited to the duration of project construction, which would occur in phases over approximately 1 year. The exact complement of noise-producing equipment that would be in use during any particular period is difficult to predict. However, the noise levels from construction activity during various phases of similar construction projects have been evaluated, and their use yields an acceptable prediction of a project's potential noise impacts. Based on USEPA (1971) data of similar public works projects, average noise levels generated by the Proposed Action are estimated to be 88 dBA  $L_{eq}$  (the energy averaged noise level, in A-weighted decibels) at a distance of 50 feet. Noise levels of this magnitude, although temporary, would be readily audible and would dominate the noise environment in the area during construction operations. Typically, the magnitude of construction noise emission varies over time because construction activity is intermittent and power demands on construction equipment (and the resulting noise output) are cyclical.

Noise levels generated at any point source decrease at a rate of approximately 6 decibels per doubling of distance away from the source (Diehl 1973). Therefore, noise levels 100 feet from the center of construction activity would be 82 dBA, at 200 feet noise levels would be 77 dBA, and at 400 feet noise levels would be 70 dBA. This calculated reduction in noise level is based only on losses resulting from spreading of the sound wave as it leaves the source and travels outward. Shielding, such as buildings, that block the line of sight would attain an additional 5 dBA or more reduction.

TEMCO would be responsible for implementing the following measures to reduce noise levels and their effects to the extent practicable:

1. Construction operations would not occur between 5:00 p.m. and 7:00 a.m. Monday through Friday. Construction operations would not take place on Saturday, Sunday, or on holidays. The hours of construction including noisy maintenance activities and all spoils and material transport would be restricted to the periods and days listed.
2. All noise-producing project equipment and vehicles using internal combustion engines (including haul trucks) would be fitted with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features. These devices would be maintained in good operating condition so as to meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) would be equipped with shrouds and noise control features that are readily available for that type of equipment.
3. All mobile or fixed noise-producing equipment used on the project, which is regulated for noise output by a local, state, or federal agency, would comply with such regulation while in the course of project activity.
4. At least 20 days prior to commencement of construction, TEMCO would provide written notification to property owners and residents within 500 feet of the project area and to the Faga'alu Village Chief, and would be posted at the access to the construction site. The notice will provide a construction schedule, required noise conditions applied to the project, and the name and telephone number of the Project Manager who can address questions and problems that may arise during construction.
5. The use of noise-producing signals, including horns, whistles, alarms, and bells, would be for safety warning purposes only.
6. All project workers exposed to noise levels above 80 dBA would be provided with personal protective equipment for hearing protection (i.e., earplugs and/or earmuffs); areas where noise levels are routinely expected to exceed 80 dBA will be clearly posted with signs stating "Hearing Protection Required in this Area."

#### **4.10 VISUAL RESOURCES**

The existing visual character of the project area includes a mix of native and introduced tropical vegetation, Faga'alu Stream, and of residential and hospital buildings. The existing visual character is typical within the region, and no areas of scenic importance exist. Primary viewers adjacent to the Proposed Action consist of nearby residents, and employees, visitors, and patients of LBJ Medical Center.

##### **4.10.1 Alternative 1: No Action**

Under the No Action Alternative, no impacts would occur to existing visual resources.

##### **4.10.2 Alternative 2: Proposed Action**

The Proposed Action would have a temporary effect on the character of the setting. During construction, existing vegetation, rock, and debris would be removed from the channel and immediately surrounding areas and construction activities would be visible from all residences near the project area and from LBJ Medical Center.



The visual character of the setting would not permanently change because modifications to the channel would not substantially degrade or alter the existing visual character or quality of the site surroundings. Implementation of the Proposed Action would not substantially damage scenic resources, including but not limited to vegetation and Faga'alu Stream, and would not create a new source of light or glare that would affect nighttime views of the Proposed Action area. Areas of fill and newly constructed channel would remain at or near the pre-existing elevation of the natural channel and would not obstruct views from the LBJ Medical Center grounds or nearby residences.

TEMCO would be responsible for implementing mitigation measures including revegetating and contouring finished surfaces to blend with adjacent natural terrain to achieve a natural appearance when the project is complete.

#### **4.11 CUMULATIVE IMPACTS**

CEQ defines a cumulative impact as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions...” (40 CFR Part 1508.7). No residential or commercial developments are expected in the near future in the vicinity of the project area. There is little physical space in the project area to develop, except for a small area on LBJ Medical Center property. LBJ Medical Center has a proposal to construct several auxiliary buildings in the project area. New building construction would likely have similar effects as the Proposed Action: minor, temporary impacts during construction activities. Because the LBJ Medical Center project would not occur until after completion of the Proposed Action, there is no potential for these short-term impacts to accumulate.

FEMA is the lead federal agency for conducting the NEPA compliance process for the PDM Program project. It is the lead agency's responsibility to expedite the preparation and review of NEPA documents in a way that is responsive to the needs of the Faga'alu Village and American Samoa residents while meeting the spirit and intent of NEPA and complying with all NEPA provisions.

TEMCO and FEMA conducted an informal scooping program at the beginning of the NEPA review process. TEMCO and FEMA met with representatives of the following agencies and organizations for their input on this PDM Program project: ASDOC Planning Division, ASDOC ASCMP, ASEPA, ASHPO, American Samoa Department of Marine and Wildlife Resources, and LBJ Medical Center.

TEMCO and FEMA circulated a Draft EA for a 2-week public comment period. The public was notified of the Draft EA availability via the FEMA web site, direct mailings to known interested parties, and publication of a public notice in the *Samoa News* on October 7, 2004. During the public comment period, FEMA accepted written comments on the Draft EA addressed to: FEMA Region IX Environmental Officer, 1111 Broadway Street, Suite 1200, Oakland, California 94607. FEMA received no comments on the Draft EA.

The public notice prepared for the NEPA process also serves as the final public notice for FEMA proposing an action affecting the floodplain and wetlands, as required by Executive Orders 11988 and 11990.

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- Robert McCord, Mitigation Specialist

**7.2 URS CORPORATION**

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- Chris Barkley, PE, Civil Engineer
- Michael Greene, Senior Project Scientist
- Vicki Hoffman, Environmental Scientist
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- Lorena Solorzano-Vincent, Biologist
- Steve Leach, Senior Biologist